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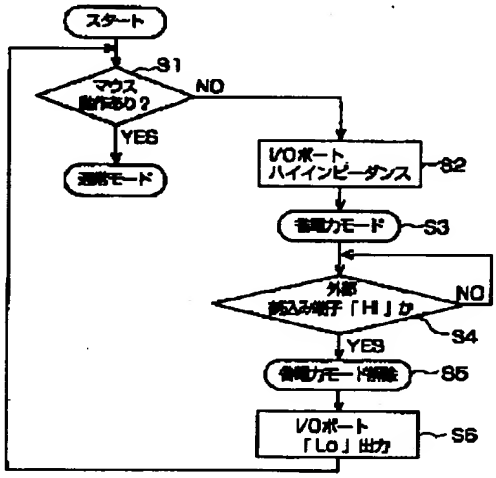
(54) MOUSE FOR INFORMATION PROCESSOR

(57) Abstract:

PROBLEM TO BE SOLVED: To prevent a battery type mouse from unnecessarily consuming its battery extremely easily.

SOLUTION: When the mouse is at a stop, the I/O port of a microcomputer is turned high-impedance state. The microcomputer enters a power-saving mode once the I/O port is turned in the high-impedance state. The external interruption input terminal and I/O port of the microcomputer go up to a Hi level a specific time after the high-impedance state is entered. When the external interruption input terminal goes up to the Hi level, the power-saving mode is reset. Once the power-saving mode is reset, the I/O port outputs Lo. Namely, a normal mode is entered.



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[0004]

[Problems to be Solved by the Invention]

In general, the mouse is frequently repeated for operation and non-operation and therefore it is extremely troublesome to turn off the power by manipulating the power switch each time as required. Moreover, there rises a problem that when operation and non-operation are repeated frequently, a user sometimes has forgot the manipulation of power switch and a battery is consumed as a result.

[0005]

It is therefore an object of the present invention to provide a battery driven mouse which can easily prevent consumption of battery.

[0006]

[Means for Solving the Problems]

According to the present invention, there is provided a mouse to be used for information processing unit, comprising a detecting means for detecting whether the mouse body is operated or not and a power saving mode control means for setting the power saving mode for the predetermined period when it is detected that the mouse body is not operated.

[0007]

Moreover, according to the present invention, there is provided a mouse for information processing unit comprising a microcomputer providing a first means for detecting whether the mouse body is operated or not operated and setting the power saving mode when the mouse body is not operated and a second means for canceling the power saving mode when the predetermined time has passed after setting of the power saving mode.

[0008]

Here, the microcomputer has an external interruption terminal and input/output port and the second means has a delaying means for setting, after the predetermined period, the input/output port and external interruption terminal for which the power saving mode is set to high level and a canceling means for canceling the power saving mode when the external interruption terminal is set to high level. The delaying means comprises a pull-up resistor and a capacitor, the external interruption terminal and input/output port are mutually connected and connected to the power supply via the pull-up resistor. Moreover, the external interruption terminal and input/output port are grounded via the capacitor and the first means sets the input/output port to the high impedance condition on the occasion of setting the power saving mode and thereafter sets the power saving mode. The power supply is formed, for example, of a battery comprised in the mouse body.

[0009]

[Embodiment of the Invention]

The present invention will be explained with reference to the accompanying drawings.

[0010]

First, with reference to Fig. 1, the battery driven mouse 11 comprises a microcomputer (micon) 12, which is previously installing the power saving mode control program. Namely, the micron 12 is provided with the power saving mode control means.

[0011]

The micon 12 is provided with the external interruption input terminal 12a and

input/output port (I/O port) 12b and the external interruption input terminal 12a and I/O port 12b are mutually connected and are then connected to the power supply line (Vcc) via the pull-up resistor (resistor R) (this power supply line is connected to the battery). Moreover, the external interruption input terminal 12a and I/O port 12b are connected to the earth line (GND) via the capacitor (capacitor C) 12d.

[0012]

Referring to Fig. 2, the micon 12 (namely, power saving mode control means) monitors whether the mouse 11 is operated or not (step s1). In more practical, the mouse 11 is provided, as is well known, with an encoder and a dip switch (both are not illustrated) and the power saving mode control means performs once the sampling of encoder and dip switch to determine whether the mouse 11 is operated or not. When the mouse 11 is operated, regular mode is maintained (in the regular mode, the micon is in the ordinary power consuming condition).

[0013]

Meanwhile, when the mouse 11 is not operated, the power saving mode control means shifts the regular mode to the power saving mode. In this case, the power saving mode control means uses the I/O port 12b as the input port. When the I/O port 12b is used as the input port, since the I/O port 12b is connected with the pull-up resistor 12c as explained above, the I/O port 12b is in the high impedance condition (step s2). The micon 12 enters the power saving mode (step s3) when the I/O port 12b becomes the high impedance condition. In the power saving mode, the mouse 11 is in the minimum power saving condition.

[0014]

Referring to Fig. 3, when the I/O port 12b is in the high impedance condition, the external interruption input terminal 12a and I/O port 12b try to change to the high (Hi) output from the low (Lo) output by the pull-up resistor 12c but this process is delayed as long as the charging time of the capacitor 12d. Namely, as illustrated in Fig. 3, the potential of the external interruption input terminal 12a and I/O port 12b gradually rises and when charging of capacitor 12d is completed, these are in the high level. In other words, after the I/O port 12b becomes the high impedance and after the predetermined delay time TD(time required for charging of the capacitor 12d), the external interruption input terminal 12a and I/O port 12b become high level.

[0015]

Referring again to Fig. 1 and Fig. 2, the power saving mode control means monitors whether the external interruption input terminal 12a becomes Hi level or not (step s4) and when the external interruption input terminal 12a becomes Hi level, the power saving mode control means cancels the power saving mode (step s5). When the power saving mode is canceled, the I/O port 12b outputs the Lo level (step s6). Namely, the I/O port 12b is in the regular mode.

[0016]

Thereafter, returning again to the step s1, whether the mouse 11 is operated or not is monitored.

[0017]

[Effect of the Invention]

As explained above, the present invention can provide the effect. Namely, whether the mouse is operated or not is monitored. Depending on the result of determination (namely when the mouse is not operated), the power saving mode is actuated for the predetermined period to attain the power saving with an extremely simplified structure without providing the power switch, etc.

[Brief Description of the Drawings]

[Fig. 1]

Diagram illustrating a microcomputer, with the peripheral circuits, comprised in the mouse of the present invention.

[Fig. 2]

Flowchart for explaining operation of the mouse of the present invention.

[Fig. 3]

Diagram for explaining the condition in which the I/O port illustrated in Fig. 1 becomes high impedance condition and then becomes high level condition.

[Description of Reference Numerals]

11: Mouse; 12: Microcomputer;